

CLAIMS

[1] A high-frequency amplifier characterized by comprising:
first amplifying means for amplifying an input signal having a plurality
of different frequency bands;

5 a plurality of first branching means each for branching the amplified
signal in the plurality of frequency bands into a signal in the highest frequency
band and a signal having the remaining frequency bands; and

a plurality of first impedance converting means each for converting
the branched signal in the highest frequency band to a load impedance of an
output terminal,

10 wherein branching in accordance with the level of the frequency band
and conversion to the load impedance are performed in order from the highest
frequency band to the lowest frequency band.

[2] The high-frequency amplifier according to claim 1, characterized by
comprising:

second amplifying means for amplifying an input signal having a
plurality of different frequency bands;

5 a plurality of second branching means each for branching the
amplified signal in the plurality of frequency bands into a signal in the highest
frequency band and a signal having the remaining frequency bands; and

a plurality of second impedance converting means each for
converting the branched signal in the highest frequency band to a signal source
10 impedance of an input terminal,

wherein branching in accordance with the level of the frequency band
and conversion to the signal source impedance are performed in order from the
highest frequency band to the lowest frequency band.

[3] A high-frequency amplifier characterized by comprising:
second amplifying means for amplifying an input signal having a plurality of different frequency bands;

a plurality of second branching means each for branching the
5 amplified signal in the plurality of frequency bands into a signal in the highest frequency band and a signal having the remaining frequency bands; and

a plurality of second impedance converting means each for converting the branched signal in the highest frequency band to a signal source impedance of an input terminal,

10 wherein branching in accordance with the level of the frequency band and conversion to the signal source impedance are performed in order from the highest frequency band to the lowest frequency band.

[4] The high-frequency amplifier according to any of claim 1 to claim 3, characterized in that the number of the plurality of different frequency bands is three or more.

[5] The high-frequency amplifier according to claim 2, characterized in that said first amplifying means and second amplifying means are connected in cascade, and said first branching means and first impedance converting means are provided between said first amplifying means and second amplifying
5 means.

[6] The high-frequency amplifier according to claim 2, characterized in that said first amplifying means and second amplifying means are connected in cascade, and said second branching means and second impedance converting means are provided between said first amplifying means and second amplifying
5 means.

[7] The high-frequency amplifier according to any of claim 1, claim 2, claim 5, and claim 6, characterized in that at least one auxiliary amplifier is

provided between said first branching means and said output terminal.

[8] The high-frequency amplifier according to any of claim 2, claim 3, claim 5, and claim 6, characterized in that at least one auxiliary amplifier is provided between said second branching means and said input terminal.

[9] The high-frequency amplifier according to any of claim 1, claim 2, and claim 5 to claim 7, characterized in that said first impedance converting means commonly convert signals in at least two frequency bands to a high impedance.

[10] The high-frequency amplifier according to any of claim 2, claim 3, and claim 5 to claim 8, characterized in that said second impedance converting means commonly convert signals in at least two frequency bands to a high impedance.

[11] The high-frequency amplifier according to any of claim 1, claim 2, claim 5 to claim 7, and claim 9, characterized in that an auxiliary impedance conversion circuit is provided between said first branching means and said output terminal.

[12] The high-frequency amplifier according to any of claim 2, claim 3, claims 5 to 8, and claim 10, characterized in that an auxiliary impedance conversion circuit is provided between said second branching means and said output terminal.

[13] The high-frequency amplifier according to any of claim 1, claim 2, claims 5 to claim 7, claim 9, and claim 11, characterized in that said first branching means comprises high-pass filters and low pass filters.

[14] The high-frequency amplifier according to any of claim 2, claim 3, claims 5 to claim 8, claim 10, and claim 12, characterized in that said second branching means comprises high-pass filters and low pass filters.

[15] The high-frequency amplifier according to claim 13 or claim 14,

characterized in that at least one of said low-pass filters is configured to selectively increase the impedance for a signal in high frequency bands branched by a high-pass filter which is paired therewith.

[16] The high-frequency amplifier according to claim 13 or claim 14, characterized in that at least one of said high-pass filters is configured to selectively ground the signal in the highest frequency band of the signal branched by a low-pass filter which is paired therewith.

[17] The high-frequency amplifier according to any of claim 1, claim 2, claim 5 to claim 7, claim 9, and claim 11, characterized in that said first branching means comprise switches using field effect transistors.

[18] The high-frequency amplifier according to any of claim 2, claim 3, claim 5 to claim 8, claim 10, and claim 12, characterized in that said second branching means comprise switches using field effect transistors.

[19] The high-frequency amplifier according to any of claim 1, claim 2, claim 5 to claim 7, claim 9, and claim 11, characterized in that said first branching means comprise switches using PIN diodes.

[20] The high-frequency amplifier according to any of claim 2, claim 3, claim 5 to claim 8, claim 10, and claim 12, characterized in that said second branching means comprise switches using PIN diodes.

[21] The high-frequency amplifier according to any of claim 1, claim 2, and claim 4 to claim 20, characterized by comprising a switch provided between an output terminal, corresponding to the frequency band, and a ground, and grounding means operative, when a signal in a frequency band is amplified and transmitted from the output terminal to a load side, in order to ground at least one of the output terminals corresponding to the remaining frequency bands through said switch.

[22] The high-frequency amplifier according to claim 21, characterized in

that said grounding means comprises a switch using a field effect transistor.

[23] The high-frequency amplifier according to claim 21, characterized in that said grounding means comprises a switch using a PIN diode.

[24] The high-frequency amplifier according to claim 21, characterized in that when the signal in the plurality of different frequency bands includes a signal in a first frequency band and a second frequency band having a range that is 1.5 to 2.5 times as high as the first frequency band, an output terminal of
5 the second frequency band is grounded by said grounding means when the amplified signal in the first frequency band is being transmitted from an output terminal to the load side.

[25] The high-frequency amplifier according to any of claim 21 to claim 24, characterized in that a switch is provided between the output terminal corresponding to the frequency band and the ground through a transmission line having the same characteristic impedance as the load impedance, wherein
5 said transmission line has a length which is determined such that an impedance, when the load side is viewed from an output terminal of said first amplifying means, establishes a short-circuit condition in the frequency band when said switch is turned on to connect to the ground.